

Serial No. 10/755,990
Docket : MIO 0065 VA/40509.282

REMARKS

In the specification, the TITLE has been amended to clearly indicate the invention to which the claims are directed. Applicant now believes the Specification complies with all formalities.

Claims 1-35 were presented for examination. Claims 1-35 were rejected. Claims 1, 5, 12 and 21 have been amended.

Rejections Under 35 U.S.C. § 102(b)

Claims 1-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by Forbes. Applicant respectfully traverses.

Claim 1, as amended, recites, in part, a method of fabricating a memory device comprising a floating gate that is substantially perpendicular to a select gate that was formed in a trench.

Forbes recites a floating gate and a control gate. However, Forbes fails to disclose a floating gate that is substantially perpendicular to a select gate. Instead, Forbes discloses parallel floating and control gates (see elements 325 and 335 in Figs. 3A, 3B, 4, and 13). Further, the floating gates are disclosed to be adjacent, not perpendicular, to the control gate (Col. 6, lines 16-20). Therefore, Applicant believes that claim 1 is not anticipated by Forbes and request the Examiner withdraw his rejection to claim 1.

Independent claim 21 as amended, also recites fabricating a memory device comprising a floating gate that is substantially perpendicular to a select gate as called for in claim 1. Therefore, for the same reasons discussed above, Applicant believes claim 21 is also not anticipated by Forbes, and requests that the Examiner withdraw his rejection of claim 21.

Claims 2-4, 6, 7, and 22-24 depend on independent claims 1 and 21 and are patentable for the same reasons as the independent claims from which they depend. Therefore, Applicant

Serial No. 10/755,990
Docket : MIO 0065 VA/40509.282

believes claims 2-4, 6, 7 and 22-24 are also not anticipated by Forbes, and requests that the Examiner withdraw his rejection of claims 2-4, 6, 7 and 22-24.

Claim 5 was amended to dependent ultimately from independent claim 1 and, therefore, is patentable for the same reasons as independent claim 1. Applicant requests that the Examiner withdraw his rejection of claim 5.

Claim 8 recites, in part, a method of fabricating a memory device where a tunnel oxide layer is formed over a substrate. A first poly layer is then formed over the tunnel oxide layer.

Forbes also recites forming a tunnel oxide layer. However, Forbes fails to disclose forming the tunnel oxide layer over the substrate. Instead, Forbes discloses forming the tunnel oxide layer substantially adjacent to the exposed sidewalls of the second troughs (Col. 10, lines 23-28). Then, a polysilicon conductive layer is formed in the second troughs (Col. 10, lines 28-31). Therefore, the polysilicon conductive layer in Forbes is not formed *over* the tunnel oxide layer as described in the claimed invention. In other words, the tunnel oxide and polysilicon layers in Forbes are formed vertically, or perpendicular, to the substrate. In contrast, the tunnel oxide and first poly layers in claim 8 are formed horizontally, or parallel to the substrate. Therefore, Applicant believes that claim 8 is not anticipated by Forbes and request the Examiner withdraw his rejection to claim 8.

Claims 9-11 depend on independent claim 8 and are patentable for the same reasons as the independent claim from which they depend. Additionally, these dependent claims recite further limitations not shown or suggested by the prior art. For example, claim 9 recites forming the STI areas by etching the nitride layer and the first poly layer to form a trench. In Forbes, the STI areas are formed by etching into the pad nitride, the pad oxide, second source/drain layer, the underlying portion of epitaxial layer, the first source/drain layer and at least partially into the underlying P- silicon substrate (Col. 9, lines 33-38). Therefore, Applicant believes claims 9-11 are also not anticipated by Forbes, and requests that the Examiner withdraw his rejection of claims 9-11.

Serial No. 10/755,990

Docket : MIO 0065 VA/40509.282

Independent claim 12, as amended, recites, in part, a method of fabricating a memory device where a horizontal floating gate is formed that is self-aligned with a STI area.

Forbes recites a floating gate. However, Forbes fails to disclose a horizontal floating gate. Instead, Forbes discloses a floating gate that is placed in the sidewall of a trench so that the resulting floating gate is vertical or perpendicular to the substrate (Col. 10, lines 23-31). In contrast, the floating gate in the claimed invention is horizontal, or parallel, to the substrate and located in the <100> plane. Placing the floating gate in the <100> plane results in a reduction of retention, cycling and trapping problems with the memory cell. Therefore, Applicant believes that claim 12 is not anticipated by Forbes and request the Examiner withdraw his rejection to claim 12.

Independent claims 25, 33 and 35 also recites a horizontal floating gate as called for in claim 12. Therefore, for the same reasons discussed above, Applicant believes claims 25, 33 and 35 are also not anticipated by Forbes, and requests that the Examiner withdraw his rejection of claims 25, 33 and 35.

Claims 13-20, 26-32 and 34 depend on independent claims 12, 25 and 33 and are patentable for the same reasons as the independent claim from which they depend. Additionally, these dependent claims recite further limitations not shown or suggested by the prior art. For example, claim 16 recites forming a TiN and a TiSi layers in the active trench. Forbes does not include the limitation of forming these layers in the trench. Instead, Forbes discloses a tunnel oxide sidewall layer and a bottom insulation layer of silicon dioxide (Col. 10, lines 14-28). In addition, claim 26 recites forming a second floating gate proximate to a second substantially vertical channel, a limitation not disclosed by Forbes. Forming a floating gate proximate to a vertical channel increases programming efficiency. Further, claim 31 includes the limitation of forming a polysilicon layer over the tunnel oxide layer. As discussed above, Forbes discloses forming a polysilicon layer adjacent to the tunnel oxide layer, not over the tunnel oxide layer (Col. 10, lines 23-31). Therefore, Applicant believes claims 13-20, 26-32 and 34 are also not

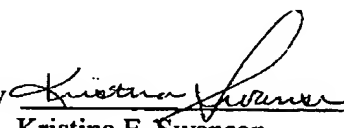
Serial No. 10/755,990
Docket : MIO 0065 VA/40509.282

anticipated by Forbes, and requests that the Examiner withdraw his rejection of claims 13-20, 26-32 and 34.

CONCLUSION

For the above reasons, the Applicant respectfully submits that the above claims represent allowable subject matter. The Examiner is encouraged to contact the undersigned to resolve efficiently any formal matters or to discuss any aspects of the application or of this response. Otherwise, early notification of allowable subject matter is respectfully solicited.

Respectfully submitted,
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